

- UBUNTU setup on raspberrypi

make ubuntu 22.04 boot sd card on laptop:

<https://ubuntu.com/tutorials/how-to-install-ubuntu-desktop-on-raspberry-pi-4#1-overview>

connect sd card on raspberrypi

connect mouse, keyboard, monitor

connect raspberrypi on 5v (external source/charger)

boot on sd card and install ubuntu

install raspi-config:

sudo apt update

sudo apt upgrade

sudo apt-get install raspi-config

sudo raspi-config

interface option

serial port

no - serial login shell disabled

yes - serial interface enabled

finish, reboot

sudo nano /boot/firmware/config.txt

include the following after last line:

enable\_uart=1

dtoverlay=disable-bt

ctrl+x, ctrl+y, enter

sudo reboot

check if the serial port is available:

cd /

ls /dev/ttyAMA0

install mavproxy:

sudo apt install python3-pip

sudo pip3 install mavproxy

sudo apt remove modemmanager

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- PX4 setup on pixhawk

connect pixhawk usb on laptop and check at QGroundControl if firmware (px4) is updated

if not, do at first time only:

sudo apt -y install gcc-arm-none-eabi make stlink-tools

clone the last PX4 version:

git clone <https://github.com/PX4/PX4-Autopilot>.git --recursive

PX4-Autopilot/Tools/setup/ubuntu.sh

build it on the pixhawk:

```
sudo chmod a+rw /dev/ttyACM0
cd /PX4-Autopilot
make px4_fmu-v6c_default upload
```

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#### - MAVlink connection

connect pixhawk usb on laptop and change parameters on QGroundControl:

```
MAV_0_CONFIG = TELEM1
XRCE_DDS_0_CFG = Disabled
SER_TEL1_BAUD = 57600
```

connect pixhawk TELEM's tx/rx/ground on raspberrypi correspondent pins

connect pixhawk on 5v (pixhawk's usb on smartphone charger for example) or keep in laptop usb

mavproxy connection on /dev/ttyAMA0 (/dev/serial0 of raspberrypi):

```
sudo mavproxy.py --master=/dev/serial0 --baudrate 57600
```

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#### - ROS setup on the raspberrypi

install ros humble:

<https://docs.ros.org/en/humble/Installation/Ubuntu-Install-Debian.html>

```
sudo apt install git
```

install xrce-dds standalone:

```
git clone https://github.com/eProsima/Micro-XRCE-DDS-Agent.git
cd Micro-XRCE-DDS-Agent
mkdir build
cd build
cmake ..
make
sudo make install
sudo ldconfig /usr/local/lib/
```

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#### - XRCE\_DDS connection

if you want to use TELEM1, you have to stop mavlink and then activate the microdds\_client. You can do that changing the parameters:

```
MAV_0_CONFIG = 0
```

to disable mavlink on TELEM1,

```
XRCE_DDS_0_CFG = TELEM1
```

to start microdds\_client on TELEM1 and SER\_TEL1\_BAUD to set the baudrate.

to use TELEM2 (ttyS3 of pixhawk):

```
XRCE_DDS_0_CFG = TELEM2
```

```
SER_TEL2_BAUD = 921600
```

To check if it is already running, in the QGroundControl's MavlinkConsole: microdds\_client status  
if not running yet, start the client in the MavlinkConsole: microdds\_client start -t serial -d /dev/ttyS3 -b 921600

In raspberrypi: sudo MicroXRCEAgent serial --dev /dev/serial0 -b 921600

to see the ROS2 topics available, in a new terminal:

```
source /opt/ros/humble/setup.bash
```

```
ros2 topic list
```

to connect both XRCE\_DDS and MAVlink, connect also pixhawk usb on raspberrypi:

```
sudo chmod a+rw /dev/ttyACM0
```

```
sudo mavproxy.py --master=/dev/ttyACM0 --baudrate 57600
```

It is not possible to configure XRCE\_DDS\_0\_CFG = USB (/dev/ttyACM0 port of laptop) only for the pixhawk's TELEM, so it would not work on laptop via USB.